CLAIMS

What is claimed is:

1. A method for forming a flare in an end of a flexible tube, comprising:

heating the end of the flexible tube to a near-melted state;

inserting the heated end of the flexible tube into a flare-forming die, the flare forming die comprising a flare forming portion;

pressing a mandrel into the end of the flexible tube, thereby pressure forming a flare in the end of the flexible tube.

2. The method of Claim 1, wherein the heating the end of the flexible tube to a near-melted state comprises contact heating the end uniformly around its circumference.

3. The method of Claim 1, wherein the heating the end of the flexible tube to a near melted state comprises heating the end of the tube for a period of at least about thirty seconds.

4. The method of Claim 1, comprising:

providing a heater comprising a plurality of contact heating receptacles; and

inserting the end of the tube into one of the plurality of contact heating receptacles.

5. The method of Claim 1, comprising:

clamping the tube in a clamping portion of the flare-forming die.

6. The method of Claim 1, comprising inserting the end of the flexible tube into the tube receptacle up to a tube stop.

7. The method of Claim 6, wherein the tube stop comprises a transitional slope of the mandrel.

8. The method of Claim 1, comprising:

pressing the mandrel into the end of the flexible tube up to a flare forming position, thereby pressure forming a flare in the end of the flexible tube.

9. The method of Claim 8, comprising:

leaving the mandrel in the flare forming position for a time sufficient to form a flare that will retain a flared shape.

10. The method of Claim 8, comprising:

leaving the mandrel in the flare forming position for at least about sixty seconds.

11. The method of Claim 1, comprising:

pressure forming a flare in the end of the flexible tube, wherein an inner profile of the flare matches an outer profile of a fitting adapted to be fitted to the end of the flexible tube.

12. A system for forming a flared end of a flexible tube, comprising:

a heater;

a flare forming die; and

a mandrel.

13. The flare forming system of Claim 12, wherein the heater comprises a contact heating receptacle adapted for uniformly contact heating the circumference of the end of a flexible tube.

14. The flare forming system of Claim 12, wherein the heater comprises a heater structure, a heating element in thermal contact with the heater structure comprising a contact heating receptacle, and a

controller to control the heating element to heat the heater structure to a desired temperature.

15. The flare forming system of Claim 14, wherein the heater structure comprises a plurality of contact heating receptacles.

16. The flare forming system of Claim 15, wherein the plurality of contact heating receptacles comprises heating receptacles adapted for receiving a plurality of sizes of ends of flexible tubes.

17. The flare forming system of Claim 12, wherein the flare forming die comprises a tube receptacle comprising a clamping portion and a flare forming portion.

18. The flare forming system of Claim 12, wherein the flare forming die comprises a plurality of tube receptacles.

19. The flare forming system of Claim 12, comprising:
a plurality of mandrels.

20. The flare forming system of Claim 12, comprising:
a plurality of mandrels arranged on a mandrel press.

21. The flare forming system of Claim 20, comprising:
at least a first mandrel spring mounted on the mandrel press.

22. The flare forming system of Claim 21, comprising:
a second mandrel, rigidly mounted on the mandrel press.

23. The flare forming system of Claim 12, wherein:
the heater comprises a plurality of contact heating receptacles adapted to receive and contact heat flexible tubes in a plurality of specific sizes;

the flare forming die comprises a plurality of tube receptacles adapted to receive flexible tubes in the plurality of specific sizes; and

the mandrel is one of a plurality of mandrels arranged in a mandrel press, the plurality of mandrels being adapted for forming flares in the ends of flexible tubes in the plurality of specific sizes.

24. The flare forming system of Claim 23, comprising:

a first mandrel spring mounted on the mandrel press and a second mandrel, rigidly mounted on the mandrel press.

25. The flare forming system of Claim 24, wherein the first mandrel and the second mandrel are each in respective tube stop positions when the mandrel press is in a preparatory position.

26. The flare forming system of Claim 24, wherein the first mandrel and the second mandrel each move through respective flare forming distances when the mandrel press is moved through a flare forming stroke.

27. The flare forming system of Claim 18, comprising a tube receptacle lock-out.

28. A flexible tube with a flared end formed by the method of Claim 1.

29. The flexible tube of Claim 28, wherein an inner profile of the flared end matches an outer profile of a fitting adapted to be fitted to the end of the flexible tube.

30. The flexible tube of Claim 28, wherein the flexible tube comprises one of PFA, PVDF or FEP.

31. A flared flexible tube assembly, comprising:

a fitting comprising an outer profile;

a flexible tube comprising a pressure formed flare engaged with the fitting, the pressure formed flare having an inner profile matching the outer profile of the fitting.

32. A flared flexible tube assembly, wherein the flexible tube comprises one of PFA, PVDF or FEP

33. A method for forming a flare in an end of a flexible tube, comprising:

heating the end of the flexible tube to a near-melted state;

placing the heated end into a first portion of a tube receptacle in a first portion of a flare forming die;

bringing a second portion of the tube receptacle in a second portion of the flare forming die into a flare forming position, thereby clamping the tube in a clamping portion of the tube receptacle;

pressing a mandrel into the end of the flexible tube;

pressure forming a flare in the end of the flexible tube for a period of time sufficient to cool the end of the tube to a desired temperature;

withdrawing the mandrel and separating the first portion of the flare forming die from the second portion of the flare forming die; and

removing the end of the tube from the flare forming die.